

3.4-O2. IFE14 seismic event identification by spectral pattern recognition and combination of array and network localization

Due to the location of the IFE14 inspection area in Jordan on the Dead Sea Rift, an abundance of natural seismic events and quarry explosions had to be ruled out as possible aftershocks from an underground nuclear explosion for the OSI seismic aftershock monitoring system (SAMS). The extreme topography and restrictions led to a reduced number in deployed mini-arrays. Nevertheless SAMS successfully detected all scenario relevant events. This study shows the current SAMS manual detection and localization techniques and how they can be extended with automatic routines. The detection of local events with low signal-to-noise ratios at very few stations (<3) with a duration of few seconds can't be realized with detectors based solely on coincidences of amplitude variances (e.g. STA/LTA) or changes in the statistic distribution of ground velocities. An abundance of local noise sources triggers false detections continuously. The use of matched filters is limited due to the low-SNR and short epicentral distances. Instead a pattern recognition based on robust noise adapted spectrograms is used. The automatic localization is done through a combination of beam-forming, fk-analysis, phase-picking and a weighted 3D grid-search which takes the certainty of each information and the topography of the area into account.

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